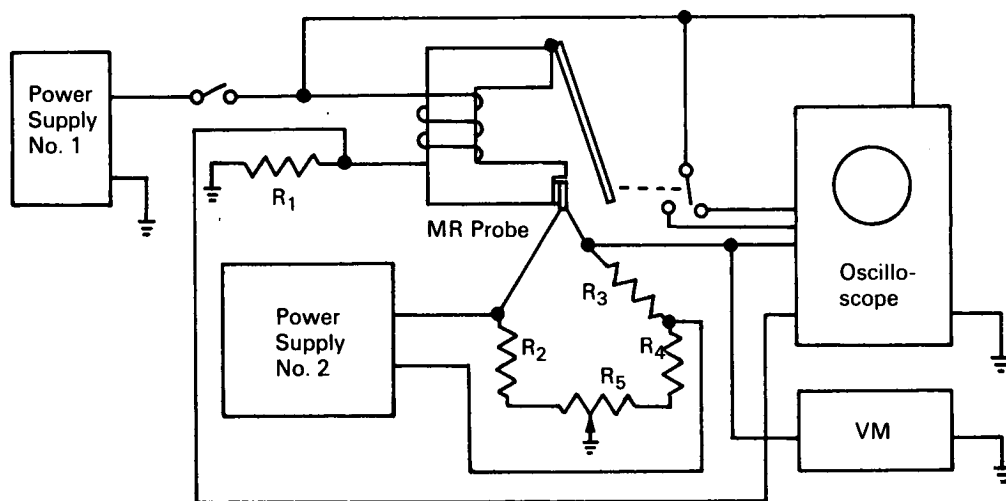


NASA TECH BRIEF



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Magnetoresistor Monitors Relay Performance



The problem:

To monitor the action of relays without disturbing circuit parameters or degrading relay performance. Normally, relay performance monitoring has been limited to fully open or fully closed position indications plus coil circuit condition. Steady-state or transient position data cannot be obtained through current monitoring because the steady-state current is dependent only on the dc resistance of the coil.

The solution:

A technique that establishes the characteristic signature of a relay by measuring the magnetic flux produced under transient conditions.

How it's done:

A magnetoresistor is placed in a recess in the contact end of the relay core. This probe is operated by its own power supply and, through a bridge circuit, its reaction to change in relay magnetic flux is indicated on a voltmeter and displayed on an oscilloscope. By photographing the oscilloscope display, voltage and current conditions related to time are made available to determine the characteristic signature of a given relay. Such parameters as contact travel time, time for coil current to reach a steady-state condition, coil voltage condition, etc. afford a clear picture of relay operating characteristics.

(continued overleaf)

Notes:

1. Many malfunctions, such as lack of armature movements, friction, welded contacts, and low coil voltage may be determined from the transient waveforms.
2. This device permits relay monitoring with a single passive sensor that does not affect relay operation or reliability.
3. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B66-10650

Patent status:

No patent action is contemplated by NASA.

Source: Darrel Q. Krebs
of The Boeing Company
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